DOCUMENT RESUME

ED 375 837 IR 055 215

AUTHOR McNicholas, C.; Nelson, P.
TITLE The Virtual School Library: Moving toward Reality.
PUB DATE Apr 94
NOTE 19p.; Paper presented at the Annual Convention of the National Catholic Educational Association (91st, Anaheim, CA, April 4-7, 1994).
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Change; *Computer Networks; Cultural Differences; Educational Environment; Females; Foreign Countries; High Schools; *Information Literacy; *Information Retrieval; Information Technology; Integrated Activities; Learning Resources Centers; Microcomputers; Optical Data Disks; *School Libraries; Secondary School Students; *Skill Development; Technological Advancement
IDENTIFIERS Australia; *Marist Sisters College (Australia); *Virtual Libraries

ABSTRACT

The response of Marist Sisters' College, Woolwich, New South Wales (Australia), to the challenges of teaching information literacy is described. Marist Sisters' College is a high school enrolling approximately 750 girls representing diverse cultures and socioeconomic backgrounds in grades 7 through 12. An integrated information-skills program, described elsewhere, has been developed across the curriculum, and networked computer terminals and CD-ROM towers have become the foundation for an information-technology program aimed at information literacy. The concept of the virtual library serves the College's aspirations for the information environment. The virtual library as it is being developed at Marist Sisters' College gives access to more information than is contained in four walls through electronic access to internal resources and external services, including catalogs and local area networks that enable remote access. Part of the virtual library approach is focusing on the skills needed to use technology as a tool. The virtual library is providing a dynamic and diverse information environment that supports the entire school curriculum. A detailed outline of the information process--defining, locating, selecting, organizing, presenting, and assessing--in terms of skills and outcomes is presented in tabular format. (Contains 12 references.) (SLD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED 375 837

The Virtual School Library: Moving Toward Reality

Ms. C. McNicholas, Teacher Librarian, Marist Sisters' College, Sydney.
Ms. P. Nelson, Teacher Librarian, Marist Sisters' College, Sydney.

> *When I was a student, half a century ago, we used to talk of the abolition of distance, because of those then comparatively recent triumphs, the telegraph, the steamship and the railway train. Some of us knew already of the possibility of radio, but nobody believed we should live to take a ticket and fly around the world. The swiftest thing upon the road was a bicycle, and television seemeda fantastic impossibilty.*
> *All my life I have seen that abolition of distance becoming more and more complete.*
>
> **(H.G.Wells: 1932)**

THE INFORMATION SOCIETY

It seems entirely appropriate, in this State and Country of movement and change, to commence a paper with this quote from H.G.Wells. Is there one of us here today for whom these words lacks meaning or relevance, particularly in the light of our role as educators? We live in an era when profound change is occurring with unprecedented rapidity. It took the 229 years between 1708 and 1937 for the Newcomen engine to evolve into the jet engine, but only 36 years for Eckert and Mauchly's first generation computer to evolve into the fifth generation computers of the 1990s.

Many of the changes we are experiencing are the result of rapid developments in information technologies and systems. Because of the impact they have on our social

BEST COPY AVAILABLE

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Prudence Nelson
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

IR055015

structure, these changes are often referred to as the 'information revolution', and what a revolution it is! While the power revolution took whole generations to evolve, the information revolution has occurred within a generation, in fact 6.5 times faster than the power revolution. And there are indicators that the speed of change in the information environment of our society is intensifying. **(Masuda, 1981)**

We talk of the Stone Age, the Bronze Age and the Iron Age implying that the materials and technology defined the era. The Industrial Revolution dealt with new ways of processing materials but had as its base the evolution of new sources of power. It follows then that we are living in the Information Age. Information has become our prime resource. The production, use and communication of information has assumed the central importance in the Information Age that the production of goods and services did in the Industrial Age. **(Mandeville, 1987)**

It is hard to argue that ours is not an information society when you consider the volumes of information available to us, and the mountains of information that are collected, collated and stored every day. The fact that ninety percent of today's scientific information has been generated in the last 30 years **(Masuda, 1981)** gives us an indication of the amount of information we are producing and the rate of its production. We have accomplished this transition to an information society with the impetus and benefit of electronic technology - technology that has provided the means by which we are able to generate, collect, store and retrieve huge amounts of information. Far more information than our scholarly forebears from any age imagined to exist let alone contemplated inscribing onto vellum for all posterity.

Moreover, the last two decades have seen an exponential increase not only in the quantity of information available but also in the number of people in western societies who work in information management industries. In Australia now, more people are employed in creating, collecting, storing, processing and disseminating information than producing food, fibres, minerals and manufacturing products **(Jones, 1990)**, and in western societies in general, more people are employed collecting, handling and distributing information than in any other occupation. **(Mason, 1986)**

But although a large percentage of the developed world may be involved in the information industry, there exist in increasing numbers those known as the 'information

poor' - individuals and societies for whom access to information, or rather the lack of access, results in their disenfranchisement - individuals who have no pathway to, skills in or knowledge of the management of information. This disenfranchisement frequently has its roots in illiteracy in its traditional, formal sense - the inability to read or write for effective communication. More often however, it is caused by the inability to locate, select or organise information into appropriate forms and to use it purposefully and effectively.

Clearly, while information technology has given rise, with a great variety of resultant benefits, to the global village and the electronic neighbourhood, our rapidly changing society presents many challenges to us as educators. We want to ensure that the increasing and undesirable inequity between the 'information rich' and the 'information poor' narrows rather than increases, that students are **empowered** by the quantity and diversity of information available to them rather than **excluded** by it and that their educational experiences assist them to become active, autonomous and productive information users. If one of the roles of education is to equip students with the wherewithal by which they can function effectively in their society, then as educators we should be equipping them with the skills to become effective and productive participants in the information society.

Thus education for the twenty-first century must be education for an information society.

> *"By the year 2000, today's children will be completing their tertiary education and will be part of a very different 21st century work force. They will be entering an information age which will require them to analyse and interpret information, to present it to others in various forms, and to form opinions and to make judgements and decisions from a wide variety of sources. They will need to be prepared to work co-operatively and productively in flexible ways and be ready to accommodate change in all aspects of life. A new set of basic learning skills will be needed to equip them to live in this changing world."*
>
> **(Vogler, 1990: 101)**

Indeed, the ability to use information effectively, that is to be able to find and use it to meet their needs, has become more important for students than the ability to learn or absorb it. Our students will find that much of the content they have been taught during their formal education will be obsolete or irrelevant by the time they join the workforce. What will equip them for their future is less likely to be the body of factual knowledge

they hold than their ability to find, select and effectively use the increasing amount of information available to them. This ability to use information purposefully and effectively, to find, organise and use it as required, is what we know as information literacy. If the ability to use information purposefully and effectively is not only a basic tool but a survival skill, if our students are to live productive and happy lives in the '90's and beyond, schools must rethink and restructure the education process within an information literacy framework.

INFORMATION LITERACY

The American Library Association Presidential Committee Report concludes that to be information literate a person must *"be able to recognise when information is needed and have the ability to locate, evaluate and use effectively the needed information. Ultimately information literate people are those who have learned how to learn. They know how to learn because they know how information is organised, how to find information, and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand."*

A second definition, and one that transfers well to the classroom, states that the information literate learner has *"... the ability to use information purposefully and effectively: it (sic) is a wholistic, interactive learning process encompassing the skills of defining, locating, selecting, organising, presenting and evaluating information."*

(Kirk, Poston-Anderson, Yerbury, 1990: 2-3)

To be successful and functional in medieval society people did not require literacy skills, but as society has changed literacy has become progressively more important. By the post -industrial age literacy was considered essential to both an individual's and a nation's ability to prosper. With the Information Age upon us, it is as crucial to the functioning of our society that its members become information literate as it was to previous societies that their members become literate.

"Information literacy is a means of personal and national empowerment in today's information-rich environment. It allows people to verify or refute expert opinion and to become independent seekers of truth. It provides them with the ability to build their own arguments and to experience the excitement of the search for knowledge. It not only prepares them for lifelong learning; but by experiencing the excitement of their own successful quests for knowledge, it creates in people the motivation for pursuing learning throughout their lives. Information literacy is, therefore, the next logical step in all current programs to combat illiteracy. After we teach people to read we must teach them how to locate and use the information they need."

(Breivik, 1992)

It is no longer important that we all know the same facts. Indeed, in modern times more than ever before, we rejoice in the diversity of knowledge and experience within our society. Humankind has taken great pains to record for posterity the huge advances we have made in the quest for knowledge. **All this is to no avail if we are not equipped to retrieve it, evaluate it, and learn from the experience**. The achievement of information literacy is critical.

In the current pedagogy schools and educators are struggling to adapt creatively to the changing nature of our society. Both in theory and practice there has been a shift in emphasis from what facts students learn, to how they learn and what 'lifelong learning' skills they develop. This 'new' focus of education should have the achievement of information literacy as one of its primary aims. The continuing trend away from concentrating education on collecting information and toward using and manipulating information presents new challenges to educators. Can we teach information literacy? What sort of school and learning environment do we need to evolve to support the development of information literacy? What role does information technology play in the quest for information literacy? In this presentation we will cover some aspects of our response at Marist Sister's College to these questions.

Marist Sisters' College is a non-selective, systemic high school catering for approximately seven hundred and fifty girls in grades seven through twelve. True to its Marist pedagogy, the school is centred on the individual. Classes other than science and mathematics are generally not streamed and the girls range in ability from gifted through to mildly intellectually challenged. Many ethnic groupings are represented in the school's population, as is a diversity of socio-economic backgrounds.

At the College the challenge of educating for information literacy has been addressed by simultaneously developing two areas which we believe to be critical to the successful achievement of the goal of information literate students. The first of these, which we will expand on later in this paper, was to develop an integrated information skills program across the curriculum. As information skills are the skills needed to find, understand and use information effectively, we see them as intrinsic to true learning in every subject area and to the overall development of information literacy. The philosophical and environmental parameters established by school administrators are crucial to the successful development of any 'whole school' programme and this aspect of our work with information literacy was presented earlier today in a session entitled ***"The Challenge of Information Literacy: a Catholic secondary school's response"***.

The second area addressed was technology. Networked computer terminals and CD-ROM towers became the foundation for the College's information technology development, a development planned to enhance and support the development of information literacy by:

- providing experience with information in a variety of formats
- improving access to information-quality, reliability, accuracy, validity, currency -quantity, diversity
- providing faster and more equitable access to resources
- developing in students and teachers the skills of defining, locating, selecting, organising, presenting and evaluating
- encouraging the re-packaging of information into new and appropriate products

We see such information technology as offering students and teachers:

- access to a greater range of information from a wider variety of sources
- access to up to date and topical information
- opportunities to refine skills of locating and selecting
- multimedia information from a single source
- increased autonomy and involvement in their own learning
- access to the information technologies found in the workplace or study institution

Our aim was to create an information environment at the College which is relevant and responsive to the needs of students and teachers and offers greater access to information than is contained within four walls. It should make information as quick and easy to access as possible, encourage the development of information skills and give access to the most appropriate and up-to-date information sources. In addition it should support the school's curriculum by not limiting learners to the use of resources within the school but creating a collection based on the resources and the extensive information infrastructure available in the wider community. The College's aspirations for the information environment seemed to be best served by the concept of the Virtual Library.

THE VIRTUAL LIBRARY

Until recently reading was the skill of choice and as that skill was mastered the world of books was opened for millions of people. As private ownership of the increasing numbers of titles was no longer a viable proposition the concept of the public library developed as a place of access and loan for paper-based information and entertainment resources. These

libraries depended for their success on the librarian's ability to accurately anticipate the users' interests and needs.

Now, when success in life can be dependant on the ability to find and effectively use information, information is power and the power that information brings should be accessible and available to everyone. Information technology has the potential to increase both the accessibility and availability of information. It has taken us beyond yesterday's image of a library or for that matter a librarian. The future, in the context of our information society, is not only one of library buildings and physical collections, but also of electronic neighbourhoods; of information exchange across boundaries between home and school, work and leisure, library and classroom, school and university and so on.

Tomorrow's library can be called a 'Virtual Library'. Although it looks and feels like a library, it is not a library in the traditional sense. *"The virtual library is one where the user has the illusion of access to a much larger collection of information than is really present, immediately or simultaneously"* **(Harley, 1980)** This virtual library is a library without the hindrance of walls or the limitations inherent in one collection of locally owned and stored resources. It is likely to contain print, image, video and sound resources and to 'contain' links and pipelines to information stores and providers, data bases, indexes, electronic mail and production facilities outside the library itself. Its capacity to offer its users a broad range of information is not limited by its physical structure, shape or size. Indeed, a single terminal in a classroom can, with the right access, be a virtual library, making the dream of 'information at your fingertips' a reality. The 'collection' in this library of the future thus comprises the actual collection and the virtual collection, the virtual collection being electronically browsable. Moreover, the virtual library's users are not dependent on the librarian's ability to predict and resource all their needs. In fact, as the virtual library moves towards reality the professional skills of the librarian are likely to be employed to provide an information service more often than an information item. **The challenge was issued: move the concept toward reality.**

At Marist Sisters' College we saw that the development of a virtual library would meet the College's aim of creating an information environment which is relevant and responsive, offers greater access to information than is contained within its four walls, makes information access quick and easy, gives access to the most appropriate and up-to-date information sources, and would support the development of information skills and literacy.

Our virtual library is being established in several stages. Stage one integrated the

automated catalogue and multimedia systems, networking the College's data systems, applications and CD-ROMs. It links the library, information laboratory, staffroom, computer room and classrooms. The network currently incorporates two fileservers, fourteen CD-ROM drives and 57 workstations, providing access to the College's Administration and Library data bases, commercial multimedia packages, text based indexing sources, various external commercial and educational on-line services. Production facilities include desk top publishing supported by CD ROM clip art and font libraries, image capture, paint programmes and the like.

Stage two incorporates three avenues of development. The expansion of both hardware and software will provide more workstations and an increase in information sources. It will also enable further links to external information sources, on-line and via satellite. In the future a cluster of surrounding schools may establish dial-up links to the network, thus enabling them to access the catalogue and CD-ROMs. One advantage of this, above and beyond sharing CD-ROM resources, is the potential to develop a union catalogue, allowing libraries in the group to develop their collections in different directions, eliminating duplication while enabling specialisation and expansion without the inherent costs in space and dollars. This next stage will also include the installation of wireless local area networks (LANs) to enable remote access workstations (laptops, notebooks etc.) to operate on the network. The implementation of stage two is planned to complement the acquisition of information skills based teaching learning practices.

The potential of the virtual library is limited by the same factor that limits the traditional print library, it is only as good as the user's level of information literacy. This being the case, in order to maximise the potential of the technology we were implementing, we needed to simultaneously address the issues of information literacy and develop the skills with which we could make the technology a tool not merely a toy - a tool that enhances our information management and equips us to take our place in our information society.

INFORMATION SKILLS

In Australian school education we have begun to come to grips with our information society and the role that educators must play in preparing students for it. Information skilling is one method by which students can develop their literacy and progress towards lifelong, autonomous learning. At the College, situated on the banks of the Lane Cove River and looking down the harbour toward the sort of views you may only have seen on

post cards - the bridge, the Opera House, the sparkling Pacific - in spite of these distractions we have been working for the last four years - moving toward the virtual library, the library without walls.

In 1988 the New South Wales Department of School Education published ***Information Skills in the School***. It is a K to 12, cross-curricula policy document which has as its focus:

- the lifelong value of information skills in vocational, recreational, social and cultural pursuits
- key concepts related to the information process, of which information skills are a part
- information skills and attitudes students should develop in order to use information effectively
- strategies for the selection and use of information sources
- appropriate and useful steps schools can take in planning, implementing and evaluating learning activities which focus on information skills

The information skills as they are referred to in the document are **defining, locating, selecting, organising, presenting and evaluating** information. In other states of Australia the same or similar documents have been adopted by the various Education Departments thus leading to a fairly homogenous perception of the skills necessary to promote information literacy. The goal is unity even if the skill names are diverse. In New South Wales the policy document requires all syllabus statements subsequent to 1988 to express information literacy as a goal in terms of their learning outcomes. In addition, it places the responsibility for implementation on all professional staff; executive, classroom teachers and teacher librarian.

It is a long term plan and involves the parallel development of both multimedia and technology access throughout the College, and the teaching and learning strategies appropriate to the acquisition of information skills. Initially the development focussed on teaching and learning strategies and on creating and managing an atmosphere of change among the staff, so that there would be a core group of teachers whose philosophical and practice commitment to information literacy and skilling could serve as an example if you will, to more readily convert the "unbelievers." This earlier work on effecting change has been documented in conference papers which can be found in the bibliography.

Essential to the successful implementation of information technology is the development of an appropriate framework within which to structure student learning experiences. It is not enough to pour the dollars into the electronic hardware without pouring at least an equal amount of energy and time into the development of a framework to train, encourage, support and motivate a school community to acquire and use the skills which will convert the gadgetry into *"a routine work tool."* **(Dunnett, 1990:32)** Establishing a climate of change and encouraging flexible and adaptive teaching practices are the cornerstones of obtaining individual and faculty commitment to the long term goals of information literacy. Strangely enough they are the very same features which identify preparedness for information skilling.

Information skills closely reflect cognitive processes and may be known by a variety of pseudonyms. They are not seen to be in a directional constant but rather a series of levels which may be continuous, as in a step ladder, used for moving in both directions. As they are used in New South Wales they incorporate the following skills:

THE INFORMATION PROCESS

SKILLS IN THE PROCESS		***PROCESS OUTCOMES***
Defining	**What do I really want to find out?** What is my purpose? Why do I need to find this out? What are the key words and ideas of the task? What do I need to do?	**Students should be able to:** • relate the task to their learning • clarify the meanings of the words of the task • identify and interpret key words and ideas in the task • state the task in their own words • work out the parts of the task
Locating	**Where can I find the information need?** What do I already know? What do I still need to find out? What sources and equipment can I use?	**Students should be able to:** • recall relevant information and skills from previous experience • recognise strengths and limitations of current knowledge and decide whether additional information and or skills are needed • identify possible sources(people, places, print, non print, etc.) • limit an investigation to a manageable size • recognise the relative worth of sources • select the best of these sources to be used • locate sources and appropriate equipment • use appropriate equipment • record details of sources that are used
Selecting	**What information do I really need to use?** What information can I leave out? How relevant is the information I have found? How credible is the information I have found? How will I record the information I will need?	**Students should be able to:** • begin to assess the usefulness of each source • use key words to locate potentially useful information in resources • skim each source for information • identify information that has links with the task • assess and respect privacy and ownership of information • assess the credibility of sources • identify inconsistency and bias • devise a system for recording their own information • summarise information • record quotations and sources
Organising	**How can I best use this information?** Have I enough information for my purpose? Do I need to use all this information? How can I best combine information from different sources?	**Students should be able to:** • review the purpose of the task • combine the information into larger units of information • combine the units into a structure • review the structure in light of the purpose of the task • adjust the structure where necessary
Presenting	**How can I present this information?** What will I do with this information? With whom will I share this information?	**Students should be able to:** • identify the requirements of different forms of presentation • consider the nature of the audience for the presentation • select the form and style of presentation appropriate to the audience and the content of the material • prepare the presentation • present the information
Assessing	**What did I learn from this?** Did I fulfil my purpose? How did I go - with each step of the process - with presenting the information Where do I go from here?	**Students should be able to:** • review the extent to which the end product meets the requirements of the task • assess their use of this process in completing the task • examine strengths and weaknesses in specific information skills • identify increases in knowledge • set personal goals for the further development of information skills

(Information Skills in the School, 1988)

BEST COPY AVAILABLE

In developing a skills based framework to support and enhance the College's movement towards information literacy, multimedia and the virtual library there were some issues to be dealt with from both the staff and student perspective. Traditionally teachers have a clear vision of just who is the knowledgeable party and who is the learner in the educational process. What is clear is that if information technology and literacy are to become integral parts of the curriculum there are lessons to be learned by the teachers rather than the pupils. There are environmental and practice principles which need to be established and present in both the teacher and the classroom if the skilling process is to be successful and productive for all parties.

The **environmental principles** are those which identify a classroom perfectly positioned to institute an information skills based teaching experience. In this classroom the educator(s) is seen to be a facilitator rather than a font of all knowledge and their role description is one which encourages the learner to ask questions, make decisions, enquire into the unknown and generally move forward toward a higher level of intellectual function. **This approach is easily characterised as one in which the teaching style is adaptive to student needs and reactive to student learning strategies,** an attitude encouraging a variety of teaching methods where no one style is always better or always used. It implies the tailoring of strategies and experiences which, being people centred, relate to particular individuals and particular needs not to particular curriculums. Generally the atmosphere is non-threatening, one which encourages curiosity, engenders openness and accepts error as a natural part of the learning process.

The **practice principles** are those which identify a classroom and teaching style which will easily adopt the philosophy of information skilling. Where appropriate and feasible the negotiation of course aims and outcomes will foster student ownership of both the content and the process of learning. When learners are aware of their goals and the intended outcomes and have contributed to their development, they can more easily focus on where they are going and how they will get there. Teachers who use a multiplicity of methodologies contribute to the diversity of learning experiences and therefore cast as wide a net as possible in relating their teaching strategies to the diversity of learning strategies present in any classroom.

A widely held misconception is that information skills are library, research or project skills. They are, in fact, intellectual skills of which one over abused application is project work. In information skilling no assumptions are made about the level of knowledge a learner brings with them to a new situation. Rather, separating what is known from what needs to be

known identifies the information gap and targets the area of knowledge to be expanded. Similarly, no assumptions are made about the skills a learner brings with them. Sometimes it is a leap of faith to assume that students can read let alone define, locate, select and organise information appropriately. Assessment of skills levels can be accomplished utilising the full gamut of evaluation procedures but generally more can be gained through the judicious use of questioning than by formal testing.

However the ability to ask clear and appropriate questions is an art and one in which the majority of teachers have little skill. Teachers are generally so focussed on where they want their students to go, they don't appreciate that the paths they have chosen with their questions may only be obvious to themselves, or worse still, that the only relationship the question has to the desired answer is in their own mind. Most of us can recollect a teacher saying in frustration, "You're not answering the question I asked.", when in all likelihood the question was so poorly focussed or constructed that the student was answering the question **asked**, not the question **intended**. Believing that the ability to construct and articulate questions appropriately is the communication skill underpinning both the teaching and learning of information skills, it became the first target of development for both teachers and students working in the introductory information skills programme at Marist Sisters' Woolwich.

In addition to the issue of **competency** in questioning, the issue of technology and its management had to be attended to. The reluctance of the human species to cope and deal with change is well documented, the reluctance of the teaching species to deal with broad changes in their curriculum area or within the sanctum of their classroom is not so well documented but, none the less, something of which we are all aware. In order to address the issue of 'techno-phobia', a prolonged and intensive development of training programmes was begun. The direction of this training was based on **needs assessment**, the training sessions were voluntary and content was developed in relation to the expressed needs of those teachers attending.

Initially the plan had been to develop training for the use and application of multimedia packages but the expression of teacher interest was in the direction of word processing and document creation. It was decidedly more productive to meet the expressed need than to persevere with the original plan. It was, in fact, practicing what we preach. The plan had made assumptions about the skills entry level of staff which were incorrect. Pursuing it would have generated a great deal of user dissatisfaction with system and, by association, with the direction of the information skilling programmes. By abandoning the original plan

and developing training sessions which were more responsive to the needs of teaching staff it was possible to develop training which identified entry level skills groups, from those whose mouse skills required intensive care to those who had 'mastered the basics' and wanted to go further with specialist drawing and editing packages. This approach placed emphasis on the progressive acquisition of skills and the nurturing of good word processing habits. The target was to equip each teacher with basic competencies that could be enhanced and developed with further training sessions, peer tutoring or by the 'individual curiosity' method. The multimedia training was not placed on the back burner. It proceeded on a parallel path with those members of staff who possessed adequate computer skills and expressed a need for any of the multimedia packages.

Although the issues above have been discussed in terms of teachers, they were the same issues that presented themselves in working with students. The inability to identify the information gap, to ask questions whose answers would clarify tasks or increase the information base, was as much an issue for learners as it was for teachers. However, the parties involved perceive the fundamental problems to be separate and different. Students are generally quick to accept responsibility for their inability to comprehend tasks or information. "I don't understand it" is a common expression of frustration. They are less likely to attribute their lack of understanding to the quality of the task or information. Teachers often affirm this for learners by reiterating what was, in its first incarnation, a question or piece of information that generated misunderstanding. A skills based methodology would require that the teacher respond by attempting to identify the cause of confusion, identifying the information gap or the language that contributed to the learners inability to comprehend fully the task or instruction.

Students often express their inability to say what they mean, thus targeting a skill that the students themselves saw as needing improvement. Teachers often express their students' inability to understand simple instructions but infrequently target their own expression as a possible cause or area needing improvement. The strategies employed to address these issues for the students were, by necessity, large and small group as well as individually based, strategies which could be used for full class participation as well as individual contact. Brainstorming, explosion charting, concept mapping, modelling and keywording are some of the techniques used. The strategies used with the teachers were individually tailored, often incorporating the principles of Co-operative Programme Planning and Teaching **(CPPT)** popularised by the Haycocks of Canada and frequently involving classroom lessons where both teacher and teacher librarian were active in the teaching process. This 'team teaching' approach serves a multiplicity of functions; it signals

impending change, it brings the information skilling experience of the information professional into the classroom, it allows teachers to observe teaching practices alternative to their own, it can encourage flexibility in learners and it gives life to the 'two heads are better than one' concept.

With the environmental and practice principles established the classroom is poised to launch into information skilling; to begin the process or to target specific skills necessary for progression through the course content. Teachers develop programmes using information skills as a framework for meaningful learning of the content. To do this, the units of work are structured around the information process, equipping students with skills which will help them make sense of the information being covered, as well as provide opportunity to sharpen their pre-existing skills. Activities and tasks are designed to focus on information management skills, subject content and competencies as appropriate.

Students are encouraged, through classroom interaction and learning tasks to develop not only skills and confidence in handling information effectively in the particular subject area being studied, but also an awareness of and ability to identify the steps of the process. If students develop, through this integrated approach, the realisation that information skills are skills they can deliberately and consciously employ to assist their own learning, then learning independence is promoted and enhanced.

As with other foundation skills the steps of the process - defining, locating, selecting, organising, presenting and assessing, should not be taught in isolation nor should they be taught as independent units of work. Do we teach our children to read and not expect them to develop their competency with experience? Do we expect them to put their reading skills away in some dark corner of their brain because it is a mathematics class?

As it is a foundation skill, we teach our children to read early in their education. We would suggest that the management of information is just as much a foundation skill in the information age as reading. In earlier studies at the College the students themselves have made insightful comments about when they believe they should have first experienced the information skilling process. It appears that whatever the age of the student they always believe that they should have been informed earlier in their schooling. **(Sivanesarajah, McNicholas and Todd, 1993: 27)**

Managing the concept of information literacy and its place in the information society was fundamental to implementing a model by which Marist Sisters' College could develop information skills as a school wide, cross curricula programme. The skills reflect cognitive processes and may be transferred and applied to the diversity of information sources that the new technologies have made available. While the skills are valuable in themselves, equipping students to manage information, they also act as a framework by which students may develop competencies with new and evolving technologies. All databases, whether on line or on disk, require the same systematic approach to information gathering as more conventional materials, and the more sophisticated databases are most effectively searched using the information skills methodology. If what computers and related technologies do best is deal with vast amounts of information then the best approach to developing learning strategies for using technology lies in developing the skills to handle information.

Consequently, the approach we took to training students and staff in the use of the information technology provided as part of our virtual library was not to teach programming skills or to emphasise training on particular databases, but to focus on the skills needed to use technology as a tool. Teachers and students needed to develop competencies that were not related to specific brands of hardware and that facilitated movement between the various software and multimedia packages. Although the training we gave did cover the basics about how our system works, on the assumption that this would develop a confident and logical approach from users, the focus has been and will continue to be on developing and refining skills relating to accessing the information provided by the technology, not on the technology itself. The issue for users of information technology is not how much they understand about the technology, but rather how effectively they can use the technology to meet their information needs. The goal for us at the College was, and still is, to build up students' and teachers' information skills and confidence so that the technology is seen as a way into information rather than a barrier. As Tobin points out:

"Education must not judge itself by the quality of the resources it has at its disposal but instead have clear goals and be judged on the outcomes achieved. The appropriate use of information technology will play a vital role in helping education meet the rate of change and assist with focusing on the importance of student outcomes."

(Tobin, 1990: 97)

Successful education for the future must focus on fostering active and autonomous

learners with the knowledge, skills and attitudes essential for lifelong learning. Such learners will be able to effectively find, process and use a variety of information sources and technologies to add to their core of knowledge; they are confident in their ability to use information effectively. At Marist Sisters' College we believe we have created, through information skilling in the context of a virtual library, an environment and a dynamic to provide such education. Through information skilling we are developing in students a foundation which enables them to analyse and interpret information, present it in new forms, use it to form opinions and make judgements and decisions and accommodate change flexibly and creatively. In the virtual library we are providing a dynamic, responsive and diverse information environment which supports the total school curriculum by providing access to an extensive information infrastructure. Students and teachers are being empowered to access the rich marketplace of knowledge and ideas that is the information society. Though the curriculums, technology and sources are diverse they can be unified by utilising the information skills framework.

BIBLIOGRAPHY

Breivik,P. Paper presented at *Information Literacy -the Australian Agenda,* 1992.

Dunnett,R. "Teaching, Learning and technology: Where Should We Be Going?" in *Stepping back Into the Nineties.* Computer Education Group Queensland, 1990.

Harley,A.J. in Butterworth "The Concept of the Virtual School Library" in *Towards the 21st century: Books and Media for the Millennium.* Kalamazoo: IASL, 1993.

Information Skills in the School. Sydney: New South Wales Department of Education, 1988.

Jones,B. *Sleepers Wake!* Melbourne: Oxford University Press, 1990.

Kirk,J., Poston-Anderson, B. and Yerbury,H. *Into the 21st Century: Library and Information Services in Schools.* Sydney: Australian Library and Information Association, 1990.

Masuda,Y. *The Information Society as Post - Industrial Society.* Tokyo: Information for the Information Society, 1981.

Pook,H. *Australia: a Technological Society.* Melbourne: Oxford University Press, 1992.

Sivanesarajah,Y., McNicholas,C. and Todd, R. "Making Sense of Science: an Information Skills Approach" in *SEN: Science Education News.* Science Teachers' Association of New South Wales 42(4), 1993, 25-27.

Todd,R., McNicholas,C. and Sivanesarajah,Y. "Evolution Not Revolution: Working Towards Full School Participation with Information Skills" in *Proceedings of the Twelfth Biennial Conference of the Australian School Library Association.* ASLA, 1991.

Todd,R., Lamb,L. and McNicholas,C. "The Power of Information Literacy: Unity of Education and Resources for the 21st Century." in *Towards the 21st century: Books and Media for the Millennium.* Kalamazoo: IASL, 1993.

Vogler,L. "Queensland Sunrise Centres", in *Stepping Back Into the Nineties.* Computer Education Group Queensland, 1990.